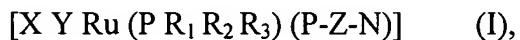


### Amendments to the Claims

1-18. (Cancelled)

19. (New) A process for hydrogenating a substrate containing a carbon-heteroatom double bond, which includes the step of reacting the substrate with hydrogen gas in the presence of a hydrogenation catalyst and of a base, wherein the hydrogenation catalyst is a transition metal complex of the formula (I)

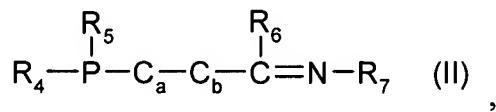


wherein

X, Y are each independently a hydrogen atom, halogen atom, C<sub>1-8</sub>alkoxy or C<sub>1-8</sub>acyloxy group, or a coordinatively bound organic solvent molecule containing at least one heteroatom having at least one free electron pair, in which case the charge of the resulting cationic complex is balanced by an anion,

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> are each independently an alkyl, alkyloxy, alkylthio, dialkyamino, cycloalkyl, cycloalkyloxy, cycloalkylthio, dicycloalkylamino, aryl, aryloxy, arylthio or diarylamino group, said groups being unsubstituted or substituted by 1,2 or 3 radicals which are each independently selected from C<sub>1-4</sub>alkyl groups and C<sub>1-4</sub>alkoxy groups, or one of the R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> radicals is as defined above and the remaining 2 radicals which, linked either via an oxygen bridge or directly to the phosphorus atom, form, including the phosphorus atom, an unsubstituted or substituted 4- to 8-membered ring,

P-Z-N is a bidentate ligand which contains an sp<sup>2</sup>-hybridized nitrogen atom and is of the formula (II)



wherein

$R_4$ ,  $R_5$  are each independently a linear, branched or cyclic unsubstituted or substituted  $C_{1-8}$ alkyl or  $C_{2-8}$ alkenyl group; unsubstituted or substituted  $C_{6-18}$ aryl  $C_{3-18}$ heteroaryl,  $C_{3-8}$ cycloalkyl,  $(C_{1-8}\text{Alkyl})_{1-3}\text{-}(Hetero)Aryl$ , whereby possible substituents are halogen, organohalogen group,  $O(C_{1-8})\text{alkyl}$ ,  $N(C_{1-8}\text{alkyl})_2$ ; or  $R_4$  and  $R_5$  together are a saturated or aromatic ring composed of 5 to 10 atoms including the phosphorus atom,  
 $C_a$ ,  $C_b$  are each a part of an unsubstituted or substituted aromatic (hetero)aryl having at least 6  $\pi$ -electrons,

$R_6$  is a hydrogen atom, a linear, branched or cyclic unsubstituted or substituted  $C_{1-10}$ alkyl or  $C_{2-10}$ alkenyl group, an unsubstituted or substituted aromatic ring, a  $-OR_6^{\cdot}$  or  $-NR_6^{\cdot}R_6^{..}$  radical, wherein  $R_6^{\cdot}$  and  $R_6^{..}$  are as defined for  $R_6$ ,

$R_7$  is a hydrogen atom, a linear, branched or cyclic  $C_{1-10}$ alkyl or  $C_{2-10}$ alkenyl group, or an  $R_7^{\cdot}\text{CO}$  or  $R_7^{\cdot}\text{SO}_2$  radical where  $R_7^{\cdot}$  is a  $C_{1-8}$ alkyl or aryl group,

or

$R_6$  and  $R_7$  together are an unsaturated (hetero)cycle composed of unsubstituted or substituted 5 to 10 ring atoms, including the carbon and the nitrogen atom to which  $R_6$  and  $R_7$  are bonded, and including or not including further heteroatoms, whereby said substrate to be hydrogenated is a prochiral monocyclic or polycyclic aryl ketone or heteroaryl ketone, optionally substituted by linear or branched  $C_{1-8}$ alkyl,  $C_{1-8}$ alkoxy groups, or halogen atoms.

20. (New) A process according to Claim 19, wherein X, Y in the formula (I) are each independently a hydrogen atom or a halogen atom.

21. (New) A process according to Claim 20, wherein X, Y in the formula (I) are each a halogen atom.

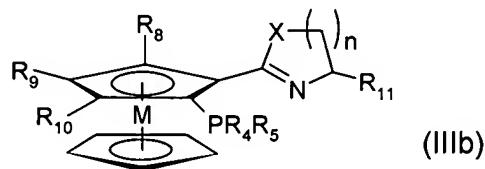
22. (New) A process according to Claim 19, wherein  $R_1$ ,  $R_2$ ,  $R_3$  in the formula (I) are each independently a methyl, ethyl, propyl, i-propyl, n-butyl, i-butyl, sec-butyl, tert-butyl, cyclopentyl, cyclohexyl, phenyl, o- or p-tolyl, p-isopropylphenyl or mesityl group.

23. (New) A process according to Claim 19, wherein R<sub>4</sub>, R<sub>5</sub> in the formula (I) are each independently a radical selected from methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, cyclohexyl, phenyl, o- or p-tolyl, mesityl,  $\alpha$ - or  $\beta$ -naphthyl.

24. (New) A process according to Claim 19, wherein C<sub>a</sub>, C<sub>b</sub> in the formula (II) are part of a pure 6  $\pi$ -electron system in the form of unsubstituted or substituted benzene or in the form of an unsubstituted or substituted cyclopentadienide ion as a ligand of a metallocene.

25. (New) A process according to Claim 19, wherein R<sub>6</sub> and R<sub>7</sub> in the formula (II) together are an unsaturated heterocycle composed of unsubstituted or substituted 5 to 10 ring atoms, including the carbon and the nitrogen atom to which R<sub>6</sub> and R<sub>7</sub> are bonded, and including or not including further heteroatoms.

26. (New) A process according to Claim 19, wherein the ligand of the formula (II) is a ligand of the general formula (IIIb)



wherein

n = 1 or 2,

M = Fe, Ru or Os,

X = O, S or N,

R<sub>4</sub>, R<sub>5</sub> are each radicals corresponding to the definition given under formula (II),

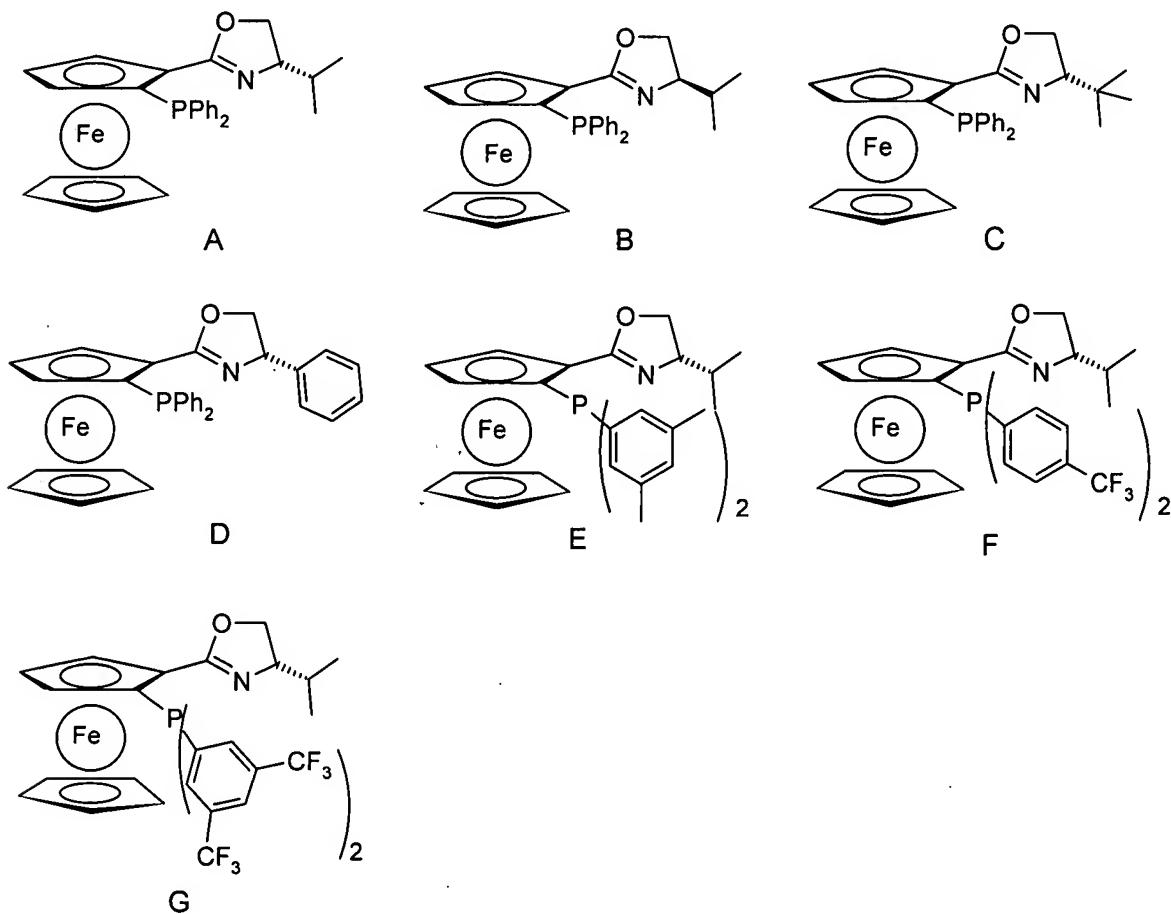
R<sub>11</sub> is a C<sub>2-8</sub>alkoxyalkyl, C<sub>7-19</sub>aralkyl, C<sub>3-18</sub>heteroaryl, C<sub>4-19</sub>heteroaralkyl,

(C<sub>1-8</sub>alkyl)<sub>1-3</sub>-C<sub>6-18</sub>(hetero)aryl, (C<sub>1-8</sub>alkyl)<sub>1-3</sub>-C<sub>6-18</sub>cycloalkyl, C<sub>3-8</sub>cycloalkyl,

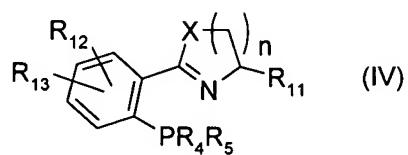
C<sub>3-8</sub>cycloalkyl-C<sub>1-8</sub>alkyl, C<sub>1-8</sub>alkyl or C<sub>6-18</sub>aryl radical,

$R_{8,9,10}$  are each independently a C<sub>1-8</sub>alkyl, C<sub>2-8</sub>alkoxyalkyl, C<sub>6-18</sub>aryl, C<sub>7-19</sub>aralkyl, C<sub>3-18</sub>heteroaryl, C<sub>4-19</sub>heteroaralkyl, (C<sub>1-8</sub>alkyl)<sub>1-3</sub>-C<sub>6-18</sub>(hetero)aryl, C<sub>3-8</sub>cycloalkyl, (C<sub>1-8</sub>alkyl)<sub>1-3</sub>-C<sub>6-18</sub>cycloalkyl or C<sub>3-8</sub>cycloalkyl-C<sub>1-8</sub>alkyl radical, or H.

27. (New) A process according to Claim 26, wherein the ligand of the formula (IIIb) is selected from the ligands A to G:



28. (New) A process according to Claim 19, wherein the ligand of the formula (II) is a ligand of the general formula (IV)



wherein

$n = 1$  or  $2$ ,

$X = O$ ,  $S$  or  $N$ ,

$R_4$ ,  $R_5$  are each radicals corresponding to the definition given under formula (II),

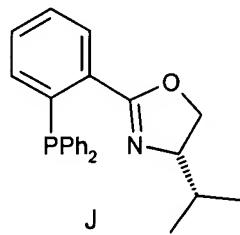
$R_{11}$  is a  $C_{2-8}$ alkoxyalkyl,  $C_{7-19}$ aralkyl,  $C_{3-18}$ heteroaryl,  $C_{4-19}$ heteroaralkyl,

$(C_{1-8}\text{alkyl})_{1-3}C_{6-18}(\text{hetero})\text{aryl}$ ,  $(C_{1-8}\text{alkyl})_{1-3}C_{6-18}\text{cycloalkyl}$ ,  $C_{3-8}\text{cycloalkyl}$ ,

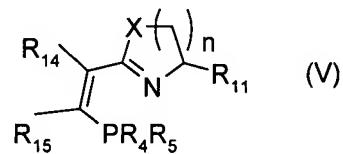
$C_{3-8}\text{cycloalkyl-C}_{1-8}\text{alkyl}$ ,  $C_{1-8}\text{alkyl}$  or  $C_{6-18}\text{aryl radical}$ ,

$R_{12}$ ,  $R_{13}$  are each independently a  $C_{1-8}\text{alkyl}$  or  $C_{1-4}\text{alkoxy}$  radical, or  $H$ , or are together a fused cycloalkyl or aryl ring.

29. (New) A process according to Claim 28, wherein the ligand of the formula (IV) corresponds to the formula J:



30. (New) A process according to Claim 19, wherein the ligand of the formula (II) is a ligand of the general formula (V)



wherein

$n = 1$  or  $2$ ,

$X = O$ ,  $S$  or  $N$ ,

$R_4$ ,  $R_5$  are each radicals corresponding to the definition given under formula (II),

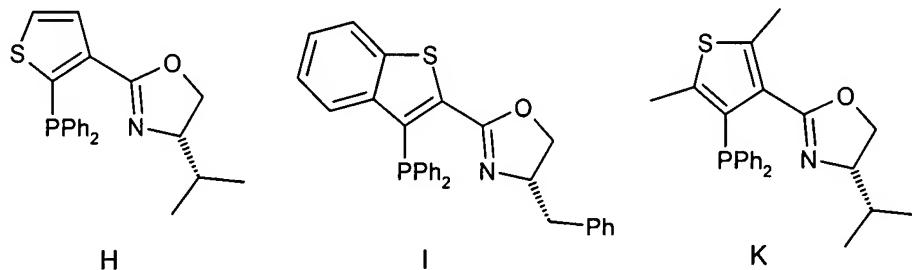
$R_{11}$  is a  $C_{2-8}$ alkoxyalkyl,  $C_{7-19}$ aralkyl,  $C_{3-18}$ heteroaryl,  $C_{4-19}$ heteroaralkyl,

$(C_{1-8}\text{alkyl})_{1-3}C_{6-18}(\text{hetero})\text{aryl}$ ,  $(C_{1-8}\text{alkyl})_{1-3}C_{6-18}\text{cycloalkyl}$ ,  $C_{3-8}\text{cycloalkyl}$ ,

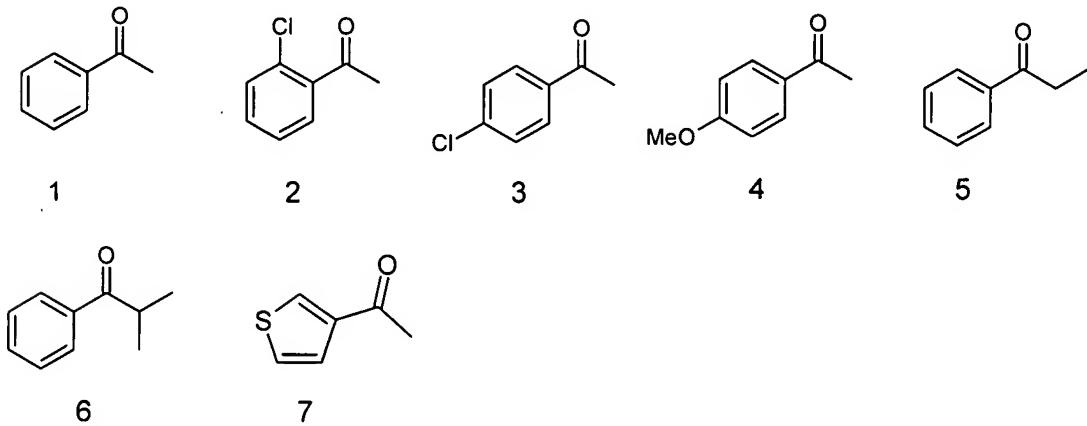
$C_{3-8}\text{cycloalkyl-C}_{1-8}\text{alkyl}$ ,  $C_{1-8}\text{alkyl}$  or  $C_{6-18}\text{aryl radical}$ , and

$R_{14}$  and  $R_{15}$  together are a 6  $\pi$ - or 10  $\pi$ -electron heteroaromatic system, unsubstituted or substituted by linear or branched C<sub>1-8</sub>alkyl radicals, and possible heteroatoms are N, O, or S.

31. (New) A process according to Claim 30, wherein the ligand of the formula (V) corresponds to one of the formulae H, I and K:



32. (New) A process according to Claim 19, wherein the substrate to be hydrogenated is selected from one of ketones 1 to 7:



33. (New) A process according to Claim 21, wherein said halogen atom is chlorine.

34. (New) A process according to Claim 26, wherein n = 1, M = Fe, and X = O.

35. (New) A process according to Claim 28, wherein n = 1, and X = O.

36. (New) A process according to Claim 30, wherein n = 1, and X = O.